

Arylthienyl-vinyl-benzothiazoles as efficient second harmonic generators (SHG) for nonlinear optics[†]

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Organic molecules comprising strong electron donors and acceptors groups connected by a π -conjugated system (often designated as donor- π -acceptor or “push-pull” chromophores) are of fundamental importance in materials chemistry due to their wide application in modern technology, such as nonlinear optical (NLO) devices, poled polymers, photovoltaic cells, organic light-emitting diodes (OLEDs), semiconductor materials and in optical data storage devices. Several push-pull molecules containing benzothiazole as an (auxiliary) electron-withdrawing group have already been reported, and typically exhibit favorable fluorescence, electrochemical, solvatochromic, photochromic, and NLO properties. We have reported the synthesis and characterization of the UV-vis, solvatochromic, thermal and second-order NLO properties of benzothiazole derivatives containing bithienyl, arylthienyl and thienylpyrrolyl heterocyclic π -spacers in order to evaluate the effect of different π -excessive donor moieties/ π -bridges on their optical properties. As an extension of our earlier work and in order to improve the thermal stability and NLO properties of heterocyclic chromophores of the benzothiazole type, we decided to synthesize arylthienyl-benzothiazoles bearing a vinyl spacer between the donor π -excessive heterocycle (thiophene) and the acceptor π -deficient benzothiazole moiety. In this work we report the synthesis and characterization of the optical and thermal properties of a series of vinyl-benzothiazole derivatives as second harmonic generators (SHG) for NLO applications.

Acknowledgements: We are grateful to the *Fundação para a Ciência e Tecnologia* (FCT) for a post-doctoral grant to R.M.F. Batista (SFRH/BPD/79333/2011), and FEDER (European Fund for Regional Development)-COMPETE-QREN-EU for financial support through the Chemistry Research Centre of the University of Minho (Ref. UID/QUI/00686/2013 and UID/QUI/0686/2016) and the Physics Centers of the Universities of Minho and Porto (Ref. UID/FIS/04650/2013). The NMR spectrometer Bruker Avance III 400 is part of the National NMR Network and was purchased within the framework of the National Program for Scientific Re-equipment, contract REDE/1517/RMN/2005 with funds from POCI 2010 (FEDER) and FCT.